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that faith in a bee's sagacity that I fancy if Mr. Darwin had continued the work for a few days, and on a scale to make it worth while, the little creatures would have found out the trick.

THOMAS MEEHAN.

Carex Pennsylvanica and Carex varia.—Whether these sedges are simply varieties, one of the other, or whether each is a true species, continues to be a mooted question. Without entering into the literature of the subject, it may be said that Gray, in the last edition of his manual, guardedly states that they “seem to run together.”

The latest that I have seen touching the question is a note by Dr. E. C. Howe, in the BULLETIN for July, 1881, wherein is advanced evidence to show that the two plants intergrade. Dr. Howe states that in a large series of specimens “separation becomes guesswork.” But does not the Doctor mean that certain characters presumed to be diagnostic of one or the other plant do not always so prove. As to the interchange, between these sedges, of characters which have been regarded as distinctive of one or the other, I fully agree with Dr. Howe; but from this I deduce, not identity of the two plants, but simply that certain differential characters are less stable than our text-books may have led us to believe.

Perhaps there is no surer way of discovering the true relationship of allied or doubtful species, whether of plants or animals, than by comparative study of their earlier stages of development. According to a now familiar biological law we expect community of origin of differing types of life to be indicated by increased similarity as we compare at successively earlier stages of development. Indeed, in recently differentiated forms, we would look for practical identity up to a point in development close upon maturity.

An application of these principles to the two *Carices* now under notice goes to show, not only that they are distinct species, but that their ancestral relationship was in some respects more remote than is their present; for certain differences between the plants are more emphasized in the earlier stages of their growth than at any later period. I refer particularly to differences in the leaves, scales and bracts and the disposition of the spikes. This fact is a significant one, and one on which the specific validity of the plants may safely rest.

But I wish chiefly to call attention to important differences in the subterranean parts of the plants which our text-books fail to recognize: *Carex Pennsylvanica* differs conspicuously from *Carex varia* in having running, underground stems. These extend in all directions from the central plant, each fostering a succession of shoots, some of which themselves become centres of a secondary series of runners, which thus distribute a numerous progeny all about their parent. I have unearthed runners bearing at intervals of a few inches four or more generations of living shoots, together with the remains of several older generations. Hence the new shoots do not always become established as separate plants, but often remain joined by underground connection, through the two or three years that they

appear to live. Where this sedge grows abundantly its runners are to be found crossing and recrossing beneath the surface, and careful excavation will show that many seemingly distinct plantlets belong to one system of underground stems. In some soils the plant grows more compactly than normally, and few runners are produced. In more favorable situations the runners are numerous, and many strike down diagonally into the earth, proceeding some inches before turning upward to the surface to bear a shoot.

The runners are at first clothed with closely imbricated scales or paleae arising from nodes all along the stem. These scales ultimately decay and become frayed into a coarse fringe, which remains appressed to the stem in whorls from every node.

In *Carex varia* we find a very different habit of growth. This species never produces running underground stems, and shows no disposition to spread, but grows in close tufts. Beneath the surface it develops a dense, knotty mass of small and closely aggregated rootstocks which bears a profusion of long fibrous roots. Year after year these rooty masses produce an abundance of new shoots, which rise from the surface amid the remains of the old. Each ultimate rootstock becomes the site for a cluster of compound shoots, and these secondary tufts, compacted together, make up the plant. A slight lateral prolongation of a shoot is sometimes necessitated by an obstruction in the most direct way to the surface, but this is the closest approach to subterranean spreading, and thus we find the plant forming neat, even-bordered tufts, there being no offshoots to mar the symmetry of outline.

In *C. Pennsylvanica* a slenderness of general habit is associated with a certain liberty of growth—a distribution of vital energy; in *C. varia* similar vegetative conditions are contracted, and somewhat modified in action, resulting in greater solidity of growth and increase in the size of parts. We may say that in the principle of growth of one we perceive decentralization, enterprise, advance in many directions; of the other, centralization, conservatism, unified strength. In none other of our species of *Carex* of the section *Montanæ* do we find the counterpart of the running underground stems of *C. Pennsylvanica*. The closest approach to them is shown by *Carex umbellata*. From its dense, matted tufts, this sedge occasionally puts off short underground stems. These, however, are more like suckers than running stems, and never stray from the main tuft, but merely aid in increasing its dimensions. *Carex pubescens* is of less tufted habit than any of the other species of this section, the shoots being irregularly produced by a progressive underground stem or rootstock. But this bears no resemblance to the running stems of *C. Pennsylvanica*, being rather stout, with short, irregularly-branched divisions. Our only other species, *Carex Emmonsii*, is of very similar underground growth to *C. varia*, the difference, in fact, corresponding to the general difference between the superterrene parts of the two plants.

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Survival of the Fittest.—When we use this expression it may be well to remember that accident has quite as much to do with fitness